

Preventing Attacks by Securing Nuclear Materials

Despite the United States' participation in various threat reduction programs for more than a decade, there are still hundreds of tons of unsecured nuclear, chemical and biological weapons and materials worldwide. Securing them is critical to prevent them from falling into the hands of terrorists. Yet even after learning of terrorist interest in acquiring weapons of mass destruction, the Administration has not pursued an aggressive strategy to secure these hazardous stockpiles within the former Soviet Union, as well as stockpiles located in other countries. Our unilateral efforts need to be accelerated, including efforts to control radiological materials within our borders, and the United States should lead a global coalition devoted to reducing this dramatic security threat.

Though securing weapons of mass destruction (WMD) has been a goal since the dawn of the nuclear age, and became increasingly so with the break-up of the former Soviet Union, this potential threat crystallized with the September 11, 2001, terrorist attacks on the United States. These attacks showed that al Qaeda's capacity for killing is limited only by the power of the weapons they are able to obtain. Evidence discovered in Kabul, Afghanistan – including crude bomb design drawings and extensive downloaded materials on nuclear weapons – confirmed al Qaeda's interest in obtaining a nuclear weapon.¹ Indeed, Osama Bin Laden has said that gaining nuclear weapons is “a religious duty.”² President Bush stated that “terrorists armed with weapons of mass destruction pose the ‘most horrifying’ danger civilization faces, and he has said that keeping WMD out of terrorists’ hands is his Administration’s ‘highest priority’.”³

Former Senator Sam Nunn has clearly articulated the simple reality of the WMD problem when he said that:

“The most effective, least expensive way to prevent nuclear terrorism is to secure nuclear weapons and materials at the source. Acquiring weapons and materials is the hardest step for the terrorists and the easiest step for us to stop. By contrast, every subsequent step in the process is easier for the terrorists to take, and harder for us to stop.”⁴

Current figures show there are 105 nuclear sites in Russia with 243 buildings that need assistance improving their security.⁵ According to the Department of Energy's National Nuclear Security

¹ Robert J. Einhorn and Michele Flournoy, *Protecting Against the Spread of Nuclear, Biological, and Chemical Weapons, An Action Agenda for The Global Partnership*, Center for Strategic and International Studies, January 2003, 9.

² “Joint Inquiry into Intelligence Community Activities Before and After the Terrorist Attacks of September 11, 2001,” *Report of the US Senate Select Committee on Intelligence and the US House Permanent Select Committee on Intelligence*, December 2002, 71.

³ Matthew Bunn, Anthony Wier and John Holdren, *Controlling Nuclear Warheads and Materials, A Report Card and Action Plan*, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University, March 2003, vii.

⁴ *Ibid.*, ix.

⁵ Amy F. Woolf, *Nonproliferation and Threat Reduction Assistance: US Programs in the Former Soviet Union*, Congressional Research Service, October 23, 2003, 24.

Administration, "these sites contain approximately 600 metric tons of nuclear materials, enough for around 41,000 nuclear warheads."⁶

SECURITY GAP: Nuclear Weapons and Materials In The Former Soviet Union Are Still Not Secure.

Not only do we know that terrorists are seeking materials to construct weapons of mass destruction, we also know where they are looking – the former Soviet Union. While a number of countries possess significant stocks of nuclear materials, the largest concentration is in the former Soviet Union, with 99 percent located in Russia and smaller amounts in Kazakhstan, Belarus, Ukraine and Uzbekistan.

Since the fall of the former Soviet Union, Russia retains more than 20,000 strategic nuclear warheads at 123 nuclear weapons storage sites, and a massive 1,350 metric tons of highly enriched uranium and weapons-grade plutonium remain dispersed in a variety of forms in numerous locations within what remains the largest network of nuclear facilities in the world, employing more than one million poorly paid workers.⁷ Many experts estimated that it only takes a few kilograms of plutonium, or several times that amount of highly enriched uranium (HEU), to make a nuclear weapon.

Russia also possesses thousands of tactical nuclear weapons that, in some respects, are more dangerous than their strategic partners. Their small size and the absence of electronic locks that could be used to secure them contribute to their vulnerability to theft or unauthorized use. Some of these weapons are small enough to fit into a backpack but powerful enough to destroy a small city. They have never been subject to any arms control agreement or monitoring, so we do not know how many there are in the Russian inventory, where they are located or how they are protected. All of this makes them extremely dangerous if they fall into the hands of terrorists.⁸

Despite improvements in the Russian economy, the state-run defense, biotechnology, and nuclear industries remain strapped for funds even as Moscow looks to them for badly needed foreign exchange through exports. Accordingly, many experts and the intelligence community have continued to express grave concerns about the diversion or theft of know-how, materials or weapons from Russia and other parts of the former Soviet Union.⁹ They have found that many of the counter-measures used by the Russians are antiquated, inadequate for dealing with the "insider threat" and insufficiently staffed and funded.¹⁰

Thefts of weapons-useable material in quantities sufficient to make a crude nuclear device have already occurred. How many thefts, the total amount stolen and, most importantly, by whom, are still in some doubt. The International Atomic Energy Agency contends that over the last decade there have been 18 confirmed thefts involving plutonium or enriched uranium.¹¹ The Center for Nonproliferation Studies of the Monterey Institute of International Studies has maintained an open source database of reported nuclear trafficking incidents in the former Soviet Union. They record 14 confirmed "proliferation-significant cases" involving the theft or attempted theft of

⁶ Ibid.

⁷ Einhorn and Flournoy, vii.

⁸ Dr. Nikolai Sokov, *Tactical Nuclear Weapons Issue Brief*, Center for Nuclear Studies, May 2002.

⁹ National Intelligence Community, *Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces*, February 2002, 3.

¹⁰ Ibid.

¹¹ Einhorn and Flournoy, 9-10.

HEU or plutonium. In five of these cases, the material made it out of the former Soviet Union. In one case involving the theft of two kilograms of HEU from a research institute in Sokhumi, Georgia, the whereabouts of the stolen material remains unknown.¹²

The Central Intelligence Agency, in its 2002 report on the security of Russian nuclear facilities, agreed with those assessments. It determined that “weapons-grade” and “weapons-usable” materials have been stolen from Russia. Moreover, it found that:

"Undetected smuggling has occurred, although we do not know the extent or magnitude of such thefts. Nevertheless, we are concerned about the total amount of material that could have been diverted over the last 10 years."¹³

In the early 1990's, former Senator Sam Nunn saw the need to take action to identify and secure loose nuclear material. He worked with Senator Richard Lugar to create the Cooperative Threat Reduction Programs – commonly called CTR or “Nunn-Lugar.” CTR, which is funded through the Department of Defense, has evolved from an initial emergency response after the breakup of the former Soviet Union, “to a more comprehensive threat reduction and nonproliferation effort, to a broader program seeking to keep nuclear, chemical, and biological weapons from leaking out of the former Soviet Union and into the hands of rogue nations and terrorist groups.”¹⁴

The Department of Energy has developed a number of programs to work in conjunction with CTR in the former Soviet Union. In 1995, the Department of Energy launched the Material Protection, Control and Accounting Program to help secure former Soviet weapons-usable nuclear materials. It later created the Initiative for Proliferation Prevention Program and the Nuclear Cities Initiative to engage unemployed weapons scientists in various peaceful commercial projects. The Department also has two other initiatives to reduce Soviet stockpiles of weapons useable material by converting this material into fuels that cannot be used as weapons.

Since the early 1990s, the United States has been actively engaged in attempts to help the Russians secure their nuclear weapons arsenal. These efforts include: decreasing vulnerability to theft of nuclear stockpiles; enhancing the safety of nuclear facilities and weapons-grade material; and curbing the diffusion of nuclear-related technologies and equipment. Despite these initiatives, a 2001 bipartisan panel report to the Secretary of Energy concluded that uncontrolled nuclear weapons material in the former Soviet Union is “the most urgent unmet national security threat to the United States today.”¹⁵ This Russia Task Force, chaired by former Senate Majority Leader Howard Baker and former White House Counsel Lloyd Cutler, was explicit in its concern about the potential for these weapons and materials being stolen and sold to terrorists or hostile nation states and used against American troops abroad or citizens at home.¹⁶ It recommended that the U.S. spend up to \$30 billion over the next eight to ten years to improve the security of Russian nuclear stockpile.

¹² Scott Parrish, *Illicit Nuclear Trafficking in the NIS Issue Brief*, Center for Non-Proliferation Studies, March 2002.

¹³ National Intelligence Community, 3.

¹⁴ “Nonproliferation and Threat Reduction Assistance: U.S. Programs in the Former Soviet Union.”

¹⁵ John T. Cappello, Gwendolyn M. Hall and Stephen P. Lambert, *Tactical Nuclear Weapons: Debunking the Mythology*, INSS Occasional Paper 46 (USAF Academy, CO: USAF Institute for National Security Studies), 12.

¹⁶ Amy F. Woolf, “Nunn-Lugar Cooperative Threat Reduction Programs: Issues for Congress,” Congressional Research Service, Updated March 6, 2002, 4-5.

The urgency of the task remains. To date, even initial “rapid upgrades” such as installing detectors on doors, putting material in steel cages, and counting the amount of material present have been accomplished for only 40 percent of the potential bomb material in Russia. Less than one-seventh of Russia’s stockpile of highly enriched uranium has been destroyed.¹⁷ And only 23 percent of Russia’s potentially vulnerable material has received “comprehensive upgrades,” that is, a complete modern security and accounting system.¹⁸ The Administration, however, has not accelerated efforts to secure loose nuclear material in Russia. Funding for “Nunn-Lugar” CTR programs has remained relatively flat over the last several years at approximately \$1 billion a year.

In its fiscal year 2005 budget request, the Administration seeks \$409.2 million for the DOD portion of the CTR programs. This request represents a \$41.6 million reduction for the CTR program overall, from the \$450.8 million appropriated by Congress for fiscal year 2004. Much of the decrease comes in the area of chemical weapons destruction and dismantlement, from \$200.3 million to \$158.4 million. Monies for other important components of the CTR program, such as warhead storage security and enhanced security for Russian and former Soviet Union biological sites, remain largely stable or with slight increases.¹⁹ Likewise, the Department of Energy’s fiscal year 2005 budget request of \$470 million for nonproliferation activities in Russia and the former Soviet Union is largely a status-quo proposal, providing no new funding initiatives and recommending a few minor budget cuts from last year’s appropriation of \$475 million.²⁰

SECURITY RECOMMENDATION

Because of the seriousness of this problem, the pace of efforts to secure loose nuclear material should be accelerated. We should move faster and take stronger measures to secure loose nuclear material before it falls in the wrong hands. The United States should meet the goals of the Baker-Cutler Commission and triple the resources spent to improve nuclear security by spending \$30 billion over the next ten years to improve nuclear stockpile security.

SECURITY GAP: Nuclear Weapons and Materials Outside the Former Soviet States are Not Secure.

Though the largest stock of unsecured nuclear material is in Russia and some of its former Republics, the threat posed by loose nuclear material extends far beyond these former Soviet states. These nations possess materials, weapons, or knowledge that can leak out beyond their borders.²¹ Some 20 tons of HEU exist at 130 civilian research facilities in 40 countries, many of

¹⁷ “New Report Recommends Seven Urgent Steps to Reduce Terrorist Threat from Nuclear Weapons and Materials,” *Nuclear Threat Initiative, Press Release*, May 20, 2002.

¹⁸ Matthew Bunn, “Preventing Nuclear Terrorism: A Progress Update,” Belfer Center for Science and International Affairs, October 22, 2003. See also, Bunn, Wier, and Holdren, 65.

¹⁹ William Hoehn, “Preliminary Analysis of the U.S. Department of Defense’s Fiscal Year 2005 Cooperative Threat Reduction Budget Request,” Russian American Nuclear Security Advisory Council, February 10, 2004.

²⁰ William Hoehn, “Preliminary Analysis of the U.S. Department of Energy’s Fiscal Year 2005 Nonproliferation Budget Request,” Russian American Nuclear Security Advisory Council, February 4, 2004.

²¹ Amy Woolf, 40.

which have no more security than a night watchman and a chain link fence.²² One such facility is located in the highly unstable nation of the Congo.

The majority of these materials are the result of Cold War era programs in which the U.S. and Soviet Union curried favor in the developing world by assisting in the building of nuclear research reactors. A recent review by the Department of Energy Inspector General highlights serious problems related to the security and safekeeping of this material which could be used to build a nuclear weapon or “dirty bomb.”²³

The Inspector General found that the Department of Energy’s program to recover this material is limited to foreign research reactors which only cover 5,200 kilograms of the approximately 17,500 kilograms of U.S.-produced material overseas.²⁴ Moreover, the Inspector General concluded that this program would only recover one half of those 5,200 kilograms due to management and funding shortcomings.²⁵ Significantly, the Inspector General discovered that the Energy Department has no plan to address and recover the remaining 12,300 kilograms of HEU used in fast reactors and other special reactors.²⁶

The Inspector General also noted that at least 56 kilograms of U.S.-produced HEU was exported to four countries now considered “sensitive” security risks which were not participating in Energy’s attempts to repatriate the material. Accordingly, the Inspector General noted that the continued failure of the Energy Department to recover more of this HEU created a growing risk of diversion to groups and governments hostile to the United States for use in nuclear weapons.²⁷

The international community has also recently acknowledged that unsecured nuclear weapons and materials are a global problem. In June 2002, the U.S. joined the leaders of the G-8 nations to create the “G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction” (Global Partnership). The G-8 has since expanded to include non-G8 countries. The “10+10 over 10” initiative committed the G-8 to a spending program whereby the U.S. would contribute \$10 billion over ten years (through programs such as “Nunn-Lugar” in the Departments of Energy, Defense, and State) and the other G-7 nations together would provide up to \$10 billion over 10 years. The U.S. spending pledge, however, is not an increase compared to what it was planning to spend before the September 11 terrorists attacks.²⁸

At the Evian summit held on the one year anniversary of the Global Partnership, the G-8 leaders announced they had received pledges totaling \$18 billion towards their goal of \$20 billion over 10 years. They also pledged to expand the list of recipients beyond the former Soviet Union states. Pakistan, for example, was cited as a state needing assistance “because of its location, the

²² Bunn, Wier and Holdren, 3.

²³ U.S. Department of Energy Inspector General, *Recovery of Highly Enriched Uranium Provided to Foreign Countries*, Audit Report DOE/IG-0638, February 2004.

²⁴ This program, now known as the Foreign Research Reactor Sent Nuclear Fuel Acceptance Program (Acceptance Program), is voluntary and funded, to a large extent, by countries that participate in it. It is currently planned to end in May, 2006, Ibid., 1.

²⁵ Ibid, 2-4.

²⁶ Ibid.

²⁷ Ibid, 4.

²⁸ “An American Security Policy: Challenge, Opportunity, Commitment,” National Security Advisory Group, William J. Perry, Chair, July 2003, 13-14.

nature of its relationship to the Taliban and al Qaeda, and its weapons of mass destruction programs.”²⁹

However, given the nuclear materials outside of the former Soviet Union that remain insecure, more needs to be done. A small step toward recognizing the global nature of insecure nuclear materials threat was taken when last year Congress permitted \$50 million of unobligated CTR funds to be used for proliferation emergencies outside the former Soviet Union.³⁰

SECURITY RECOMMENDATION

The Administration should accelerate its efforts to recover or secure the thousands of kilograms of HEU that the United States shipped to other countries during the Cold War.

The U.S. commitment of \$10 billion over ten years to address the threat from unprotected materials and weapons of mass destruction is an important step forward but is only a “status quo” proposal – no significant increase from what our country had already planned to spend pre-September 11. The U.S. contribution of \$10 billion over the next decade should be the floor, not the ceiling, of our commitment to address this problem. We should encourage the G-8 to also expand their level of contributions since the threat from terrorists possessing WMDs is an international threat, not limited to any one country. Moreover, we should encourage greater participation by other countries in support of the Global Partnership as well as expansion of the list of recipients to include those nations that pose a substantial risk of diversion of WMD materials, technology or know-how. Congress should authorize CTR funds to be used for threats outside the former Soviet Union.

SECURITY GAP: Sources of Radiological Materials That Can be Used for “Dirty Bomb” Attacks Are Not Secure.

The catastrophic attacks of September 11, 2001, highlighted the nation’s vulnerability to unconventional forms of terrorism. One such threat is the use of commercially available radiological material in the construction of a “dirty bomb.” Though not weapons of mass destruction, such bombs, or radiological dispersion devices (RDDs – the technical term for “dirty bombs”), are weapons of mass disruption that can cause debilitating economic and environmental damage, as well as wide-spread panic and fear.³¹

Recent press revelations have disclosed that the FBI has warned law enforcement over the past year that terrorists were interested in obtaining radiological materials to create a dirty bomb,³²

²⁹ Sharon Squassoni, “Nuclear Threat Reduction Measures for India and Pakistan,” Congressional Research Service, Updated May 5, 2003, 1.

³⁰ Senator Richard Lugar’s keynote address to a symposium sponsored by the Embassy of Kazakhstan and the Nuclear Threat Initiative, December 16, 2003.

³¹ Radioactive material that could be used to construct a dirty bomb include: cobalt-60, strontium-90, cesium-137, iridium-192, and americium-241. Among other things, these materials are used to treat cancer, sterilize food and medical instruments, and detect flaws in pipelines and other types of metals.

³² John Solomon, “Congress, Energy Department Document Lost Radioactive Material, Terror Concern,” Associated Press, November 10, 2003. See also, Joby Warrick, “Study Raises Projection for ‘Dirty Bomb’ Toll,” *Washington Post*, January 13, 2004, A2.

and its potential use was one of the reasons for the nation's fifth "code orange" alert issued on December 21.³³ The U.S. Coordinator for Counter Terrorism, Ambassador-at-Large Cofer Black said, while attending the February 2004 anti-terror summit in Indonesia, that U.S. officials are "killing themselves" to make sure terrorists don't get a so-called "dirty bomb."³⁴

A dirty bomb can be produced by using explosives in combination with radioactive material. Much of the radioactive material used in these devices is encapsulated or sealed in metal to prevent dispersal. A dirty bomb would use explosives in combination with these "sealed sources" to disperse the material upon detonation. The explosion itself will cause the greatest amount of immediate injuries, fatalities, and property damage. Those in close proximity to the explosion can be exposed to radiation for an extended period of time and potentially be at risk of cancer over the long-term.³⁵

Dirty bombs also have the potential to contaminate many city blocks from the site of an explosion causing substantial economic loss and clean-up costs. A recent report done for the National Defense University estimates that the economic impact from a successful RDD attack in a major metropolitan area would likely equal or even exceed the \$41 billion cost of the September 2001 al Qaeda attacks in New York City and Washington, D.C.³⁶

Since 1999, federal investigators have documented 1,300 cases in which radiological material (sealed sources) has been lost, stolen or abandoned inside the U.S.³⁷ The Nuclear Regulatory Commission estimates that approximately one licensed U.S. source is lost every day of the year, and these sources have "escaped proper control and their locations are unknown."³⁸ The General Accounting Office and others studying this problem have issued these findings:

- The most likely route for terrorist acquisition of intermediate quantities of radioactive materials is through open and legal purchase from a legitimate supplier.³⁹
- The actual number of radioactive sources is unknown because no entity keeps track of this information. The Nuclear Regulatory Commission (NRC) estimates there are approximately two million sealed sources in the United States and have been forced to contract with a private investigation firm to help locate the owners of sealed radioactive sources.⁴⁰
- The Department of Energy doesn't have enough secure storage to take control of sources no longer wanted by the current holder.

³³ John Mintz and Susan Schmidt, "Dirty Bomb Was Major New Year's Worry," *Washington Post*, January 7, 2004, A1.

³⁴ Steven Gutkin, "US Terror Expert Warns of Dirty Bomb," Associated Press, February 8, 2004.

³⁵ A recent National Defense University report notes that some forms of radiological attack "could kill tens or hundreds of people and sicken hundreds or thousands." Peter D. Zimmerman with Cheryl Loeb, "Dirty Bombs: The Threat Revisited," *Defense Horizons*, January 2004, 1.

³⁶ *Ibid.*, 9.

³⁷ General Accounting Office, "Federal and State Action Needed To Improve Security of Sealed Radioactive Sources." GAO-03-804, April 2003, 4.

³⁸ Zimmerman and Loeb, 2.

³⁹ *Ibid.*, 3.

⁴⁰ GAO-03-804, 4.

- The current NRC licensing process leaves sealed sources vulnerable since it approves an applicant to buy sealed sources without any inspection or verification of how the material will be used. Because the process assumes the applicant is acting in good faith, it could take up to a year before the NRC finally conducts an inspection of the applicant.⁴¹
- There also is no requirement that a foreign supplier selling radioactive material to a U.S. end-user verify the validity of any license submitted by the American purchaser. Likewise, U.S. exporters of radioactive material are not required to notify the competent authorities in the destination country that such material has been shipped or to verify its recipient's bona fides.⁴²
- The International Atomic Energy Agency says there are 110 countries without the regulatory infrastructure to adequately protect or control sealed sources.⁴³
- A survey of U.S. and international holders of sealed materials reveals the controls vary greatly and are mainly focused on protecting public health and safety rather than on security from theft or misuse.⁴⁴

Although the fiscal year 2005 budget provides support for several ongoing programs to assist in nuclear and radiological cleanup, the request for the Radiological Dispersal Devices (RDD) program to secure, consolidate, and dispose of potential radiological weapon sources internationally has been reduced over 20 percent or \$9 million, relative to the \$36 million provided for the current fiscal year.

SECURITY RECOMMENDATION

In order to address the serious threat from a “dirty bomb,” the Administration, should, at a minimum, restore funding levels for the RDD program to at least the fiscal year 2004 amounts. The next step to improve our security from such an attack is to conduct a threat assessment that would identify those sources most likely to be used by terrorists. Such an approach would allow both domestic and international authorities to appropriately prioritize their regulatory and security resources. In addition, U.S. and international licensing rules must be refocused from health and safety concerns to address the more pressing security and counter-terrorism realities of today. Specifically, the NRC's licensing rules must be toughened to ensure the bona fides of any purchaser of radiological materials before they can acquire them. The United States should require foreign suppliers to verify that shipments of radioactive materials into the United States are sent to valid license holders. Likewise, U.S. export regulations should ensure that consignees have valid national licenses to receive radiological materials. Finally, radiological screening at our borders should receive the necessary support from the Administration to ensure that such material will be stopped before it can be used as a weapon against the United States.

⁴¹ Ibid., 22-23.

⁴² Zimmerman and Loeb, 3.

⁴³ General Accounting Office, “*US and International Assistance Efforts to Control Sealed Radioactive Sources Need Strengthening*,” GAO-03-638, May 2003, 17. <http://www.gao.gov/atext/d03638.txt>

⁴⁴ Ibid., 20.